SPORTS GLOVE WITH PADDING

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention is generally directed to the design of gloves and, in particular, towards a sports glove which will dissipate the energy of vibration transmitted through a baseball bat to the hands of the batter. The glove may also shield the back of a batter's hand from the blunt-force impact of a pitched ball.

Description of Related Art

[0002] When an individual hits a hard baseball with a baseball bat, the impact of the baseball imparts vibration to the bat. If the baseball contacts the bat at its center of percussion (sweet spot), the vibration imparted to the bat is minimal. However, as the point of impact deviates from the center of percussion, the vibration imparted to the bat increases. This vibration is transmitted to the hands of a batter holding the bat. As a result, a ball which impacts the bat away from the center of percussion may impart sufficient vibration to the bat which, in turn, is transmitted to the hands of the batter, such that the batter feels a sudden sting which, on occasion, may be painful.

[0003] While it is entirely possible to wear a glove that is padded to dissipate the energy of such vibration, prior art gloves include so much padding that the bat may slightly shift within the batter's hands, the glove may not be sufficiently flexible because of the padding, and the thickness of the padding may cause the batter to lose the "feel" of the bat. Additionally, stiff and/or thick padding does not permit the glove to conform to the hand of the batter which further lessens the "feel" of the bat for the batter.

[0004] Therefore, there is a need for a sports glove designed specifically for holding a baseball bat which minimizes by dissipation the vibration imparted to the batter's hands from the bat while, at the same time, maximizes the flexibility and the "feel" of the bat.

[0005] Furthermore, it is not uncommon for a baseball player facing a high-speed pitch to be hit by the pitch and, more particularly, to be hit in the metacarpal region of the hand holding the bat. Because the hand is between the bat and the ball and because the bat has a relatively hard surface, the pain and injury inflicted to the player's hand may be significant from this blunt-force impact. However, gloves having a padded back have not been designed exclusively for baseball batters and other padded gloves that might provide protection to the back hand of the batter include excess padding which, once again, encumbers the flexibility of the batter and affects the "feel" of the bat by the batter. Therefore, a batting glove which provides protection to the batter's hands, but does not adversely affect flexibility and allows the batter to retain the "feel" of the bat, is also desired.

SUMMARY OF THE INVENTION

[0006] One embodiment of the subject invention is directed to a vibration dissipating sports glove for use in holding a bat while hitting a baseball, wherein portions of the glove correspond to bones in a wearer's hand to which the glove is intended to cover comprising:

a) a palm portion of the glove, for covering the inner surface of a wearer's hand, exclusive of the thumb;

b) a back portion of the glove for covering the outer surface of a wearer's hand, exclusive of the thumb;

c) a thumb portion of the glove for covering the wearer's thumb, wherein the thumb portion is coupled to the palm portion; and

d) a vibration dissipating front pad in the palm portion extending only over and between the proximal knuckles of the thumb, index finger and middle finger and along adjacent portions of the metacarpal bones and proximal phalanges of each of these thumb and fingers respectively, leaving the remainder of the palm portion unpadded, wherein

the energy of the vibration that may be transmitted to the wearer's hand at the time of impact of a baseball with a baseball bat is dissipated by the pad.

[0007] The glove may further include back padding at the back portion of the glove covering only the region defined by the metacarpal bones of the index finger, middle finger, ring finger and small finger.

[0008] The glove may also include a knuckle pad at the location of each the middle knuckles of each finger, excluding the thumb.

[0009] The glove may further include a wrist portion with a pad containing an energy dissipating comformable media.

[0010] The glove may also have padding only at the back portion of the glove.

[0011] Finally, the front pad of the glove may be used to conform between the bat and the batter's hand to allow the batter to have a more secure grip on the bat.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Figure 1 is a sketch of a hand highlighting the bones therein;

[0013] Figure 2 is a first embodiment of the subject invention illustrating the palm portion of a glove with the vibration reducing pad extending to the middle finger;

[0014] Figure 3 is a cross-sectional view along arrow "3-3" in Figure 2;

[0015] Figure 4 is a variation of the embodiment illustrated in Figure 2 with the vibration reducing pad extending to the ring finger and along the proximal phalange of the thumb;

[0016] Figure 5 is a second embodiment of the subject invention illustrating one embodiment of a back portion of a glove;

[0017] Figure 6 is a third embodiment of the subject invention illustrating another embodiment of a back portion of a glove;

[0018] Figure 7 is a cross-section along lines "7-7" in Figure 64.

[0019] Figure 8 is a fourth embodiment of the subject invention illustrating a back portion of a glove;

[0020] Figure 9 is a fifth embodiment of the subject invention illustrating a back portion of a glove;

[0021] Figure 10 is a sixth embodiment of the subject invention illustrating a back portion of a glove; and

[0022] Figure 11 is a seventh embodiment of the subject invention illustrating a back portion of a glove.

DETAILED DESCRIPTION OF THE INVENTION

[0023] Figure 1 is a sketch of the bones of a human hand and elements of the sports glove in accordance with the subject invention will be described relative to the bones and the hand parts covered by the glove. A hand 10 includes a thumb 20, index figure 30, middle finger 40, ring finger 50, and small finger 60 extending from the metacarpal region 15 which is connected to the wrist 17. Extending from the wrist 17 is a cluster 19 of connecting bones and extending from this cluster 19 is the thumb metacarpal 22, the index finger metacarpal 32, the middle finger metacarpal 42, the ring finger metacarpal 52 and the small finger metacarpal 62. Any reference hereinafter to fingers will be directed to the index finger 30, the middle finger 40, the ring finger 50 and the small finger 60 to the exclusion of the thumb 20 for which separate reference will be made.

[0024] The distal ends of the metacarpal bones associated with the fingers are laterally secured to one another by tendons to define the metacarpal region 15. The inner surface of the metacarpal region 15 is generally referred to as the palm 70. Extending from the metacarpal bones of the fingers are the proximal phalanges 24, 34, 44, 54, 64 associated with the thumb 20, the index finger 30, middle finger 40, ring finger 50 and small finger 60, respectively. Extending from the distal ends of the proximal phalanges are the middle phalanges 36, 46, 56 and 66 of the index 30, middle finger 40, ring finger 50 and small finger 60, respectively. Directing attention to the index finger 30 between the proximal phalange 34

and the middle phalange 36 is a middle knuckle 37. A similar middle knuckle 47, 57, 67 is defined at the intersection of the middle phalange and proximal phalange of each of the middle finger 40, ring finger 50 and small finger 60, respectively. The thumb 20 has extending from the thumb metacarpal 22 a proximal phalange 24 with a proximal knuckle 28 therebetween. Additionally, opposite the proximal knuckle 28 on the proximal phalange 24, is a distal knuckle 27.

[0025] Sports gloves in accordance with the subject invention will be defined in general by the elements of a hand which fit within the sports glove and, furthermore, the elements of the hand will be defined by the bones of the hand.

[0026] Figure 2 illustrates one embodiment of the subject invention. The sports glove includes a palm portion 115 extending from the wrist portion 117. Extending from the palm portion 115 is a thumb portion 120, an index finger portion 130, a middle finger portion 140, a ring finger portion 150 and a small finger portion 160. A back portion (not shown) of the glove covers the outer surface of the wearer's hand, exclusive of the thumb portion 120.

[0027] At the intersection of the metacarpal bones for each finger and thumb with the distal phalange of each finger and thumb is a proximal knuckle indicated by 28, 38, 48, 58 and 68 of thumb 20 and fingers 30, 40, 50 and 60, respectively (Figure 1).

[0028] A vibration reducing pad 180 (Figure 2 but shown exaggerated in phantom in Figure 1) in the palm portion 115 extends only over and between the proximal knuckles 28, 38, 48 (Figure 1) of the thumb 20, index finger 30 and middle finger 40 and along adjacent portions of the metacarpal bones (22, 32, 42) and proximal phalanges of each of these thumb 20 and fingers 30, 40, respectively, leaving the remainder of the palm portion 115 unpadded such that a significant portion of the energy of the vibration transmitted to the wearer's hand at the time of impact of a baseball with a baseball bat is dissipated by the pad 180 while, at the same time, the remaining palm portion of the glove is unpadded and, therefore, flexible.

The front pad 180 may extend along the index finger metacarpal bone 32, index finger proximal flange 34 and the thumb metacarpal bone 22 an index finger distance D. In doing so, the pad 180 covers the index finger proximal knuckle 38 and the thumb proximal knuckle 28. Furthermore, the front pad 180 may extend along the middle finger metacarpal bone 42 and proximal phalange 44 a middle finger distance E, thereby covering the middle finger proximal knuckle 48. The front pad 180 is generally "T" shaped. In another embodiment, illustrated in Figure 4, the vibration reducing pad 180 may have an additional pad portion 180a which extends to the proximal knuckle 58 of the ring finger 50. The vibration reducing pad 180 may also have another additional pad portion 180b which extends along the proximal phalange 24 of the thumb 20 and terminates before reaching the distal knuckle 27.

[0029] As illustrated in Figure 3, the pad 180 may be comprised of energy dissipating conformable media 182, such as polyborosiloxane, encapsulated in a non-porous flexible sheath 184, such as PVC or polyurethane having a thickness of approximately 12 gauge. The encapsulated media is held in place against the glove 100 by a section of material 185, such as leather or synthetic leather, placed over the media 182 and encapsulating layer 184 and secured to the glove 10c. This fabrication process is well known to those skilled in glove making. The layer 184 may, however, be vacuum formed.

[0030] The conformed nature of pad 180 has an additional advantage. When a batter grasps a bat, irregular surfaces and different densities present in the palm and fingers prevent the batters hand from gripping the bat with uniform contact over the palm and fingers. However, since the pad 180 is conforms between the batter's hand and the bat, at least in the area of the pad 180, the batter is better able to grip the bat with uniform contact, thereby resulting in a more secure grip.

[0031] Additionally, the glove 100 may be made of a flexible fabric material typically used for gloves, such as nylon or cotton. However, in a preferred embodiment, the glove material is nylon and the pad 180 is attached to the nylon.

[0032] Directing attention to Figure 5, a second embodiment of the subject invention further includes back padding 190 at the back portion 170 of the glove 100, whereby the back padding 190 covers only the region defined by the metacarpal bones of the fingers and, in particular, covers the index finger metacarpal bone 32, middle finger metacarpal bone 42, ring finger metacarpal bone 52 and small finger metacarpal bone 62 when the glove 100 is positioned upon the wearer's hand. The back padding 190 may be comprised of an energy dissipating conformable media encapsulated in a flexible layer. As an example, the media may be polyborosiloxane while the flexible layer may be PVC or polyurethane having a thickness of approximately 12 gauge. The back padding 190 may be comprised of a single flat pad, as illustrated in Figure 5.

[0033] In the alternative, as illustrated in Figure 4, the back padding 190 may be comprised of a plurality of discrete strips 192a-e, each containing an energy-dissipating conformable media. As illustrated in Figure 7, each strip may be comprised of the energy dissipating conformable media 195 encapsulated in a plastic sheath 197a-e secured to the glove 100, either on top of the existing glove material or in place of the existing glove material. The energy dissipating conformable media may be, for example, polyborosiloxane , while the plastic sheath 197a-e may be a flexible layer of PVC or polyurethane having a thickness of approximately 12 gauge. The plastic sheath 197a-e may be mounted upon a flexible substrate 199 which would be secured to the glove 100. In the event the back padding 190 replaces the existing glove material, then it would be necessary to secure the back padding 190 to the material through such means as sewing or another positive attachment mechanism known to those skilled in the art of glove manufacturing. The strips 192a-e may be vacuum formed to

provide a plurality of strips having a common substrate for the back padding 190. In such a fashion, the back padding 190 may be secured directly to the outside of a glove or may be secured to cover an opening in the back of the glove intended to receive the padding.

[0034] It is important that the plastic sheath 197a-e secured to the glove 100 is pliable enough to permit the conformable media 195 to deform and, therefore, dissipate the energy of impact. Therefore, the plastic sheath 197a-e may be a layer of polyurethane and, more particularly, may be a polyether aromatic polyurethane, such as Stevens Polyurethane ST-1880-87, provided by the Stevens Urethane Company. While this material is discussed with respect to sheath 197a-e, it should be appreciated that this material may be applicable to the sheaths for media in any of the embodiments discussed herein.

[0035] As illustrated in Figure 6, each strip has a length L and a width W. For the embodiment illustrated in Figure 6, the ratio between the length and width of at least one strip is between 0.7 and 1.5. Furthermore, directing attention to Figure 7, each strip also has a height H and the ratio of the width-to-height for at least one strip is between 0.25 and 0.50. There are two families of strip thicknesses and the first family has now been described.

[0036] By utilizing strips as opposed to a single pad, the energy-dissipating conformable media is contained within certain regions predefined by the strips. To the extent the conformable media may flow to one segment or another of the single flat pad, or a plurality of very large strips, the proportioned strips in certain embodiments of the subject invention retain the flowable media within critical areas of the glove.

[0037] Briefly directing attention to Figure 11, a glove 200 has the same features as those illustrated in Figure 2 and, furthermore, has a back padding 290 with individual strips 292a-h. Each of these strips is thinner than those strips illustrated in Figure 6 and, as a result, more strips may be used to form the back padding 290, thereby defining a second family of strip thicknesses. Just as before, each of these strips has a length L and a width W and, in a

fashion similar to that illustrated in Figure 7, a height H. For the glove illustrated in Figure 11, the ratio between the length L and the width W of at least one strip is between 1.5-3.0. Furthermore, the ratio of the width W to the height H of the at least one strip is between 0.15 and 1.0.

[0038] Returning to Figure 6, the glove 100 has a central axis 198 and the plurality of strips 192a-e are parallel to one and are aligned with the central axis 197. By providing discrete strips 192a-e aligned with the central axis 198, maximum flexibility is afforded to the wearer's hand. As an example, when a hand is laid flat upon a table, the proximal knuckles 38, 48, 58, 68 (Figure 1) of the fingers 30, 40, 50, 60 align along the planar surface of the table. However, when the hand is formed into the shape of a fist, the proximal knuckles of the fingers now form an arch about a central axis which aligns with the central axis 198 of the glove. As a result, by aligning the plurality of strips 192a-e with the central axis 198, maximum flexibility is afforded to the hand of the wearer when grasping a bat. On the other hand, since the metacarpal bones move relative to one another to form the arch but do not themselves bend then with the strips 192a-e generally aligned with the metacarpal bones the strips do not need to flex in any other direction. To the extent, however, that each strip contains an energy-dissipating conformable media that itself is relatively flexible, it is possible to position the strips in an orientation different from that illustrated in Figure 6.

[0039] Directing attention to Figure 8, a glove 300 has back padding 390 comprised of a plurality of strips 392a-f which are perpendicular to a central axis 398 extending through the glove 300.

[0040] In yet another embodiment illustrated in Figure 9, a glove 400 has a central axis 498 extending therethrough and a back padding 490 comprised of a plurality of strips 492a-f, wherein the plurality of strips a-f are parallel to one another and form an angle A with the central axis 498 of between 0-90°.

[0041] And yet another embodiment Figure 10 illustrates a glove 500 having back padding 590 comprised of a plurality of strips 592a-f which form parallel curved surfaces upon the glove 500.

[0042] The strips associated with each of the embodiments discussed herein may have proportions similar to the strip proportions specifically discussed with respect to Figures 6 and 11. Additionally, the knuckle pads associated with the embodiment illustrated in Figure 11 may also be used with the sports gloves in accordance with the other embodiments presented herein.

[0043] Figures 6, 8, 9 and 10 illustrate gloves having strips which are each oriented in different directions. Since the batter's hand arches about an axis parallel to the hand central axis, (see axis 198 in Figure 6), and also arches in a direction perpendicular to an axis parallel to the hand central axis, then it is most desirable to orient the strips in a direction angled from both an axis parallel to the hand central axis and an axis perpendicular to the hand central axis. Such desirable configurations are found in Figures 9 and 10. When the hand arches, there is a tendency to spread apart the strips illustrated in Figures 6 and 8 and, therefore, for these designs the spacing between the strips may be made closer.

[0044] What has so far been described is a front pad positioned on the inside of the glove between the index finger and the thumb and a back padding positioned on the outside of the glove protecting the metacarpal portion of the hand.

[0045] In yet another embodiment, as illustrated in Figure 11, knuckle pads 250a-d are positioned upon the glove 200 at the location of each of the middle knuckles 37, 47, 57, 67 (Figure 1) of the index finger 30, middle finger 40, ring finger 50 and small finger 60, respectively, but excluding the thumb. Each of these knuckle pads is constructed in a fashion similar to the back padding 190 illustrated in Figure 6. Once again, at least one knuckle pad

has a length L and a width W, wherein the ratio of the length L to the width W is between 0.7 to 1.5.

[0046] As also illustrated in Figure 11, it is entirely possible to include an additional wrist pad 270 in the region of the wrist 17 (Figure 1) of the glove 200. While this feature is not illustrated in Figure 11, such a feature is easily envisioned and may be implemented by one skilled in the art of manufacturing gloves.

[0047] The media used in the front pad 180, the back padding 290, 390, 490, 590 and the knuckle pads 250 may be identical and in this fashion the same media is used to dissipate through the front pad 180 vibrators caused by the impact of the ball against the bat and to dissipate the blunt-force impact from a baseball hitting the back padding 290, 390, 490, 590 and or the knuckle pads 250a-d. Prior art designs utilize different materials to dissipate vibration from the bat and dissipate the blunt-force impact of a baseball.

[0048] What has been described is a vibration dissipating sports glove for use in holding a bat while hitting a baseball which includes a front pad between the index finger and the thumb and, furthermore, may include protection on the back portion of the glove such as a back padding in the metacarpal region of the hand and knuckle pads protecting the middle knuckles of the fingers.

[0049] While specific embodiments of the invention have been described in detail, it will be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. The presently preferred embodiments described herein are meant to be illustrative only and not limiting as to the scope of the invention which is to be given the full breadth of the appended claims and any and all equivalents thereof.